PhoCheck+ Instrument User Manual V2.5

PhoCheck+ 1000Ex, PhoCheck+ 2000Ex, PhoCheck+ 3000Ex, PhoCheck+ 5000Ex

Register your instrument online to receive your Extended 2 Year Warranty. See page 38 for details.

Declaration of conformity

Manufacturer: Ion Science Ltd, The Way, Fowlmere, Cambridge, England. SG8 7UJ

Product: PhoCheck+ 1000, 2000, 3000 and 5000

Product description: Intrinsically safe photo-ionisation detector for detecting volatile organic compounds

Directive 94/9/EC **ATEX**

Identification: Ⓔx II 2 G Ex ia IIC T4 (-20°C ≤ Ta ≤ +60°C)

Notified Body: Baseefa Ltd, 1180, Buxton, UK

EC Type Examination Certificate(s)

Baseefa03ATEX742	latest supplement Baseefa03ATEX742/8X issued 1st July 2009 Ref Baseefa Cert Report 03(c)0400, 05(c)0007
IECEx BAS 04.0033	latest revision no.5 issued 3rd July 2009 IECEx Test Report UK/Bas 04/0642 05/0007 GB/BAS/EX TR09.0116/00

Standards

BS EN 60079-0:2006	Electrical Apparatus for Potentially Explosive Atmospheres – General Requirement
BS EN 60079-11:2007	Explosive Atmospheres – Equipment Protection by Intrinsic Safety I
BS EN 61010-1:2001	Safety requirements for electrical equipment for measurement, control and Laboratory use – General requirements

Directive 2004/108EC Electrical Equipment – Electromagnetic Compatibility (EMC)

BS EN 61326-1:2006	Electrical equipment for measurement, control and laboratory use – EMC Requirements (Class B and General Immunity)

Other Standards

BS EN ISO 9001:2000	Quality Management Systems – Requirements
BS EN 13980:2002	Potentially Explosive Atmospheres – Application of Quality Systems

On behalf of Ion Science Ltd, I declare that, on the date this product accompanied by this declaration is placed on the market, the product conforms to all technical and regulatory requirements of the above listed directives.

Name: Mark Stockdale **Position:** Technical Director

Signature: **Date:** 20th November 2009

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Introduction to PhoCheck+

PhoCheck+ is a portable gas detector, suitable for the detection of a large range of Volatile Organic Compounds (VOC's), which are dangerous from both a poisoning and explosive perspective. Total VOC's are detected using PID (Photo Ionisation Detection) technology.

The PhoCheck+ versions are fully upgradeable in the field (i.e. PhoCheck+ 1000 to a 5000 or a 2000 to a 3000 etc). See page 37 for more details relating to upgrade options.

PhoCheck+ has two principle modes of operation; Survey and Health & Safety. Health & Safety mode is available on 3000 and 5000 versions.

Survey is the default mode of operation. This mode is often used in applications such as Head Space Sampling and Leak Detection where several areas (or Zones) are to be monitored and readings data logged. All sensor readings are real time measurements and alarm levels are set manually.

Health & Safety mode is used to check for conformity of short-term exposure levels (STEL) or time-weighted averages (TWA) that are specific for particular hazardous environments (for example EH40 in the UK and OSHA in the USA). In this mode of operation STEL's and TWA's are continually calculated and compared to levels set in the instrument's gas table. For more information on these modes of operation please see page 19.

PhoCheck+ versions 2000, 3000 and 5000 automatically data log the readings every second. These readings are stored in the instrument's memory with a date and time stamp. For more information please see page 18.

Getting started

1. Rechargeable Batteries

PhoCheck+ instruments leave the factory fully charged, however prolonged periods of storage may result in the battery pack discharging. We recommend charging the instrument for 12 hours before use. See the battery section of this manual page 28.

2. Alkaline Batteries

Fit the battery pack supplied with the PhoCheck+. For more information please see the battery section of this manual page 28.

3. Selecting a gas from the internal gas table

PhoCheck+ instruments leave Ion Science pre-set for gas type TVOC (total volatile organic compounds). Instruments are factory calibrated against isobutylene and all response factors are equivalent to this. By changing the gas from the gas table all readings will be given using that gases response factor. To change the selected gas please see page 18.

- Turn the instrument on by pressing the key.
- Press and hold the key and check the correct gas, alarm levels and zero mode are selected.
- The screen will flash for 1 minute while the detector warms up – check for a reading on the display
- Between 0.2ppm and 2ppm.
- Replace the probe and filter with the blue carbon filter – check for a reading from 0.0 to 0.2ppm.
- Remove the carbon filter and replace the probe and filter.
- If the results are not as expected, perform a custom calibration first ensuring the correct gas is selected.

4. Setting alarm levels

We recommend that alarm levels are set to user specifications as soon as possible before being used for the first time. Please see page 16 for details of how to set alarm levels.

5. Setting date and time

We recommend that the correct local date and time be set to the instrument as soon as possible before being used for the first time. Please see page 18 for details on how to set the date and time.

Instrument Functions

Keypad function descriptions

ON/OFF

To switch the PhoCheck+ instrument ON - Press the ON/OFF key.
To switch the PhoCheck+ instrument OFF - Ensure you are on the 'DISPLAY/FUNCTION SELECTION SCREEN' or a Display screen. Press and hold the ON/OFF key. A TIMER symbol will appear and a line will travel across the bottom on the screen, release the ON/OFF button once the line has travelled the length of the screen. The DELAY symbol will briefly appear before the instrument turns OFF completely. This procedure has been designed to avoid accidental switch OFF.

Wait Symbol

ENTER
This key selects options and confirms settings.

ESCAPE
This key is used to return the display to the previous screen and to abort an adjustment. Repeated pressing of this key will return the display to the DISPLAY/FUNCTION SELECTION SCREEN.

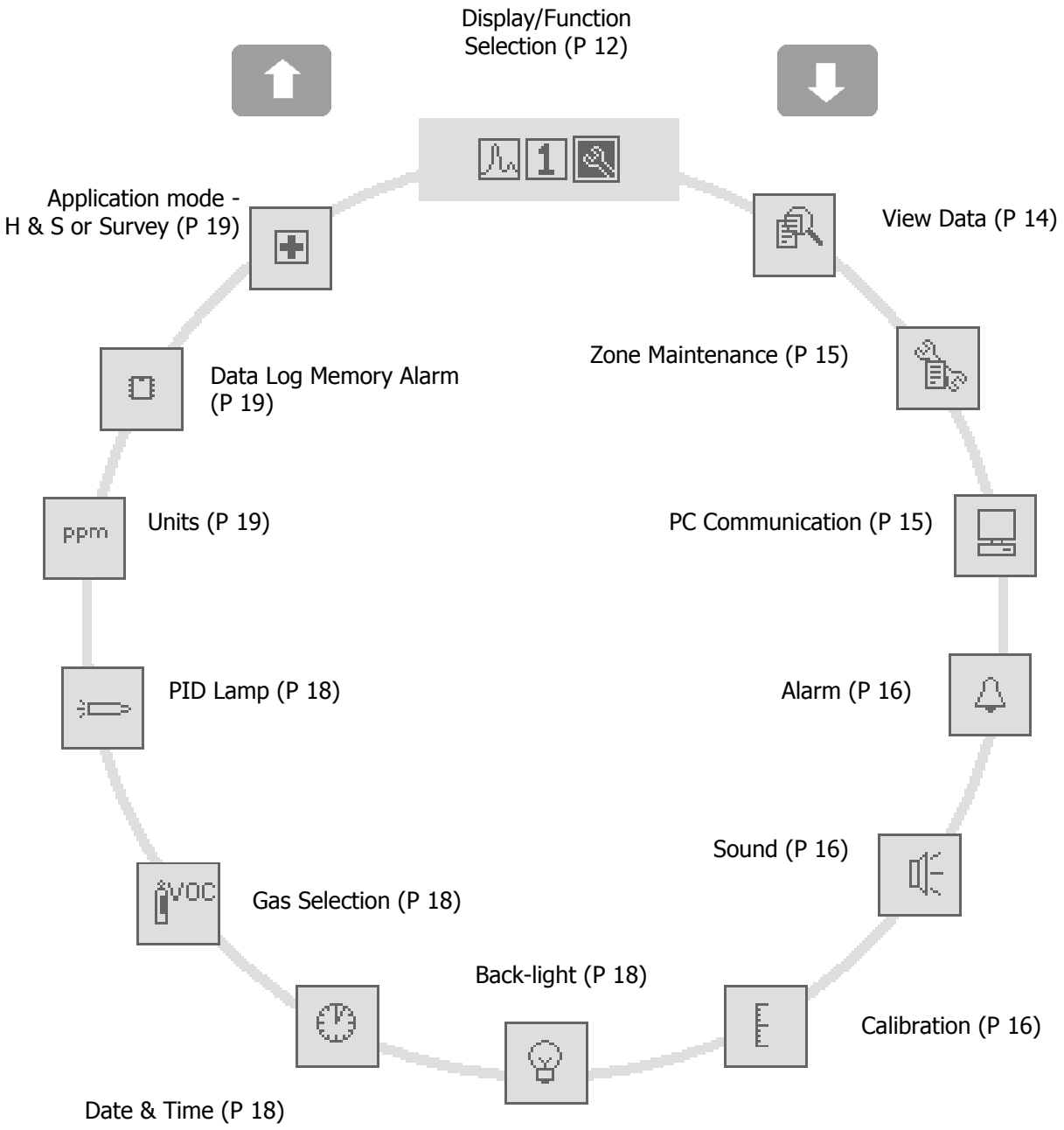
UP
Use to scroll up or change selection

DOWN
Use to scroll down or change selection

ZERO
Pressing the Zero key Zeros-out background readings. See the 'INSTRUMENT DISPLAY' section of this manual for more detail (Page 12)

Instrument Functions

Function locations



From the DISPLAY/FUNCTION SELECTION screen highlight the function menu icon then press ENTER, use the UP/DOWN keys to view the available functions then press ENTER to select the function options

Instrument Functions

How the PhoCheck+ Menu Works

Once in the function menu with the function-symbol you require on the screen press the ENTER key to select it. (See Figure 1.)

Fig 1

A cursor (highlighted symbol or number) can be moved from one selection to another by using the UP and DOWN keys. (See Figure 2.) Pressing 'Enter' will cause the selection to flash. When flashing use the UP and DOWN keys to adjust it.

Fig 2

When you have adjusted the parameter to an acceptable level press the ENTER key. The adjusted parameter will be stored. In many cases a tick (✓) will appear to confirm the action.

Although there is a variation in complexity of some functions, this basic concept of selection, adjustment and confirmation is common throughout this instrument.

You can abort a selection by pressing the ESCAPE (Esc) key.

Quick Reference

This quick reference indicates which functions are relevant to which instruments.

Display/Function Selection (Page 12)
PhoCheck+1000, 2000, 3000, & 5000

Allows the user to view detected VOC levels in either graph or number format and to adjust the instrument functions and parameters.

View Data (Page 14)
PhoCheck+2000, 3000 & 5000

Allows viewing of stored data in the instruments internal memory.

Zone Maintenance (Page 15)
PhoCheck+2000, 3000 & 5000

Allows the creation, selection and deletion of Zone names.

Data Transfer (Page 15)
PhoCheck+1000, 2000, 3000 & 5000

Enables data transfer between instrument and PC/laptop.

Alarm (Page 16)
PhoCheck+1000, 2000, 3000 & 5000

Allows the adjustment of upper and lower Alarm levels in survey mode.

Sound (Page 16)
PhoCheck+1000, 2000, 3000 & 5000

Allows the selection of audible indicators including a confidence beep.

Calibration (Page 16)
PhoCheck+1000, 2000, 3000 & 5000

Allows the selection of Factory or Custom calibration.

Quick Reference

Back-light (Page 18)
PhoCheck+1000, 2000, 3000 & 5000

Allows the selection of back-light options.

Date / Time (Page 18)
PhoCheck+2000, 3000 & 5000

Allows the adjustment of the date and time.

PID Gas Selection (Page 18)
PhoCheck+ 1000, 2000, 3000 & 5000

Allows the selection of gases from the internal gas table.

PID Lamp (Page 18)
PhoCheck+1000, 2000, 3000 & 5000

Allows the selection of different PID lamps.

Units (Page 19)
PhoCheck+1000, 2000, 3000 & 5000

Allows the selection of ppb, ppm or mg/m^3 as measurement units.

Data log Memory Alarm (Page 19)
PhoCheck+2000, 3000, & 5000

Allows the setting of an alarm to warn the user when the data logging memory is full.

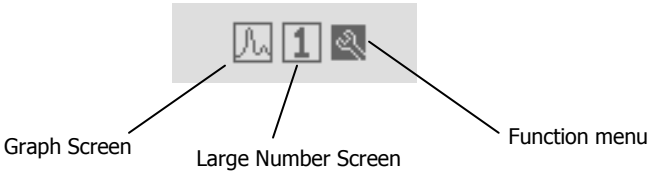
Application (Page 19)
PhoCheck+3000 & 5000

Allows the selection of modes of operation, 'Health and Safety' for STEL and TWA monitoring or 'Survey' for general use. The PhoCheck+ 1000 & 2000 instruments do not have Health & Safety mode as standard and are Survey instruments only, however Health and Safety mode is an upgradeable feature.

Instrument Display

Display/Function Selection Screen

The DISPLAY/FUNCTION SELECTION SCREEN or Top Menu is found by repeatedly pressing the ESCAPE (Escape) key. The DISPLAY/FUNCTION SCREEN allows the user to switch between the graphical readings, the digital readings and the Tools Menu. The symbols shown on this screen can be selected using the UP and DOWN keys. The highlighted symbol appears as shown in the example below for the function menu.



Instrument Symbols Explained

Symbols are used to indicate features in the menu. Please see an explanation of each below.

Bump Test

This symbol of a gas bottle can be set via the IonPC software to be displayed once a week when the instrument is turned on. This is to remind the user to test the instrument responded accurately when it is supplied with gas. See page 20of the software section for more information.

Battery Status

Charged Discharged

The battery status indicator can be accessed by pressing and holding on the graphical and the digital displays.

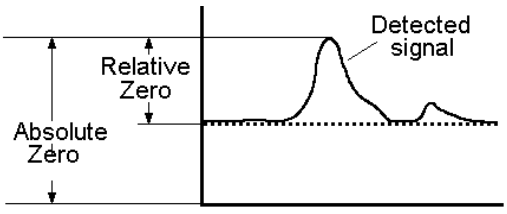
Peak Hold

The number to the right of this symbol indicates the highest gas concentration reached by the instrument since being switched ON. This PEAK reading can be reset by pressing and holding the ENTER key for 5 seconds.

Background Zero Reference

When in SURVEY mode pressing the ZERO key alternates between RELATIVES and ABSOLUTE modes. There is always some volatile gas in ambient air, which is detectable with PhoCheck+. ABSOLUTE mode displays the entire sensor signal. RELATIVE mode REMOVES the ambient signal and sets the ZERO point at an artificial level.

Relative Absolute



Instrument Displays

Alarm arrows

The arrows represent the importance level of the alarm. The single arrow represents the lower alarm and the two arrows represent the upper alarm.

Application (PhoCheck+ 3000 & 5000)

Indicates that 'Health & Safety' mode is selected

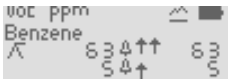
When the symbol is present the instrument is in HEALTH & SAFETY mode. When it is absent the instrument reverts to SURVEY mode. Please see Application section of this manual for more information (page 19).

Display Screens Explained (PhoCheck+ 1000, 2000, 3000 & 5000)

Graphical Display

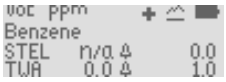
Allows the viewing of real-time measurements in graph format relative to the set alarm levels.

When in SURVEY mode the type of gas being detected, the measured units, the peak hold and real-time readings are also displayed.



Additional information such as alarm levels and battery status can be viewed by pressing and holding the ENTER key.

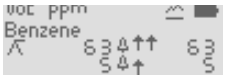
When in HEALTH & SAFETY mode (see page 19) the on screen information is slightly different as STEL and TWA calculations are displayed in figures and the graph remains in real time. Again additional information can be viewed by pressing and holding the ENTER Key.



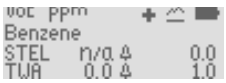
Digital Display

Enables the viewing of real time measurements in large numerical format for easy viewing in varied light conditions.

Additional information such as alarm levels, battery status and a peak hold reading can be viewed by pressing and holding the ENTER key.



When in HEALTH & SAFETY mode the STEL and TWA alarm levels and calculated values are shown when holding the ENTER key. (PhoCheck 3000 & 5000)



Function Menu

Once selected use the UP and DOWN keys to highlight the function you require and press ENTER to select. Many features can be adjusted in this section including gas selection, zone maintenance, data transfer and alarm levels. Details of these and other functions are to be found from page 12.

Function menu

Instrument Menu

In the Tools Menu use the UP and DOWN keys to find the function you require. To select the function, press the ENTER key.

Data Logging, Zones & Files (PhoCheck+ 2000, 3000 & 5000)

PhoCheck+ automatically data log the instruments readings every second. These readings are stored in the instrument's memory with a date and time stamp. The instrument has been designed to continuously store data; once the memory has reached its full capacity (8 Mb) it will automatically begin to overwrite previous readings. An alarm can be set (see page 16) to inform the user that this is due to happen, giving time to download any data that may be over written.

Stored data can be viewed on the PhoCheck+ instrument or it can be downloaded to a PC for analysis and to be archived. Ion Science recommends downloading saved readings once a week.

In some applications readings need to be recorded in many different locations leading to many hundreds of stored files. PhoCheck+ was designed with these requirements in mind and has the facility to store files into ZONES. The PhoCheck+ has a default Zone called Zone 0 (which can not be deleted), unless specified all readings will automatically be stored under this Zone. The PhoCheck+ has an additional 199 Zones which the user can name themselves, either direct via the instrument or by using the IonPC software.

View Data (PhoCheck+ 2000, 3000 & 5000)

This function allows the stored data to be viewed or deleted

First select the Zone of interest by moving the cursor using the UP and DOWN keys, press ENTER to select it.

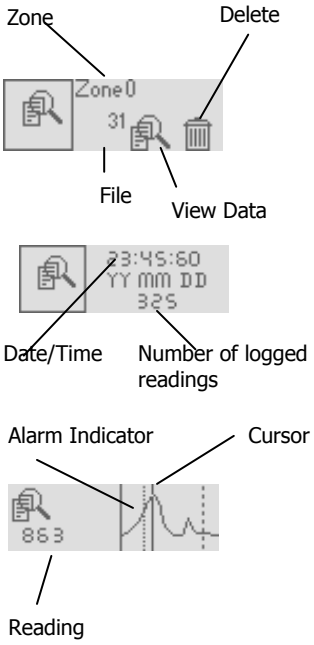
Then select the required File in the same way. Now select the View Data symbol, this will show the first reading logged with a date and time stamp and the number of logged readings within the selected file.

To view the stored data in a graphical form press the ENTER key. A graph representing the stored readings within the selected file will be displayed.

The flashing cursor can be moved along the graph to a reading of interest.

When the cursor stops the reading will be displayed in the units selected, press the ENTER key to see the date and time stamp of that reading if required.

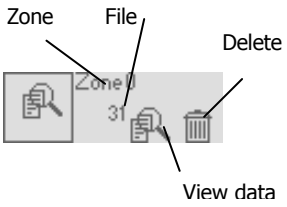
The Alarm Indicator dotted line is present on a graph to show that this is the exact point at which an alarm was set off. The instrument will continue to alarm until the alarm is acknowledged by the user by pressing the ENTER key, this is shown on the graph as a dashed line (Alarm acknowledgement).



Instrument Menu

Deleting a File (PhoCheck+ 2000, 3000 & 5000)

Should you wish to delete a File, select the Zone and file to be deleted as if you were about to view the data. Now select the delete symbol (Trash can) in the View Data screen. Options are given to delete the currently selected File or All Files.

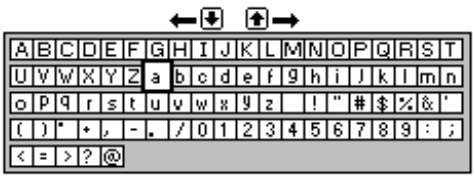


WARNING: Selecting All Files will delete all files stored in all Zones.
A tick '✓' confirms the function has been carried out.

Zone Maintenance (PhoCheck+ 2000, 3000 & 5000)

Zones can be created, selected or deleted in this function. Select the NEW symbol to create a new zone name, the LIST symbol to select an existing ZONE and the Delete symbol to delete an existing zone name.

Selecting the NEW symbol allows the creation of Zone names made up of 8 characters consisting of letters, numbers and symbols. Use the up and down keys to choose the characters and press enter to confirm your selection. Letter order on the instrument is shown on the right, the highlighted A is the start letter.
Selecting the LIST symbol allows you to view existing Zone names, and to select the zone under which you wish to save data.



Selecting the DELETE symbol allows the previously created Zone names to be deleted. A tick '✓' confirms a Zone has been deleted.

Please note that when deleting a zone all data saved under this zone will be deleted. If you wish to keep the data ensure you download it to a PC before it is deleted. Zones can also be added, edited and deleted via the IonPC software.

PC Communication (PhoCheck+ 1000, 2000, 3000 & 5000)

When this menu option is selected the instrument is ready to communicate with a PC.

To begin communication between the instrument and the computer select the Data Transfer option. When the instrument is communicating with a PC a '✓' will be displayed in the data transfer symbol and when not communicating an X will be shown. Place the instrument on its side with its infrared window a few inches from the PC's IRDA . To exit the data transfer option press the ESC key.

Instrument Menu

Alarm (PhoCheck+ 1000, 2000, 3000 & 5000)

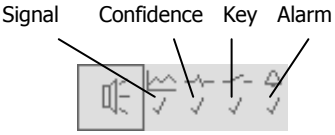
When in SURVEY mode, upper and lower alarm levels can be set by the user to indicate particular levels of detection specific to their needs.

Both alarms give an audible and visible output (flashing LED) but with increased urgency with the upper alarm. An alarm state indicates that PhoCheck+ has detected the user set alarm level which has been exceeded. The alarm will continue to sound and flash until the user acknowledges the alarm by pressing ENTER. **Please note that it is the user's responsibility to respond appropriately to an alarm condition**.

Upper and lower alarm levels in survey mode are simple to set via the instrument. Use the up and down keys to select the Alarm graphic in the function menu and press Enter. Then select the alarm you wish to adjust (Upper or Lower), press enter again then use the up and down keys to change the alarm setting. These alarms can also be easily adjusted on a PC via the Gas Table in the IonPC software. Please note that for safety reasons the lower alarm cannot be set above the upper alarm and the upper alarm cannot be set below the lower alarm.

When in Health and Safety mode, alarms are triggered by STEL and TWA alarm levels pre-programmed into the instrument's gas table. An Alarm in Health & Safety mode indicates the user has been exposed to levels exceeding those set within the gas table. When PhoCheck+ alarms in Health and Safety mode, the relevant TWA or STEL figure shown on the display will flash. These values cannot be changed either via the instrument or the IonPC software.

Sound (PhoCheck+ 1000, 2000, 3000 & 5000)



Audible outputs can be selected to indicate functions. When Signal is selected, the rate at which the instrument BEEPS increases with the detected gas. When Confidence is selected the instrument BEEPS every few seconds to indicate it is functioning. This feature can be useful if the instrument is out of sight. When Key is selected the instrument BEEPS when a key on the keypad is pressed. Alarm can only be adjusted using the IonPC software to avoid the accidental switch off.

Calibration (PhoCheck+ 1000, 2000, 3000 & 5000)

'Factory calibration' is set by Ion Science during instrument manufacture. 'Custom calibration' can be set by the instrument user.

General description
Due to the linear output of the Ion Science PID detector , PhoCheck+ instruments only require a two-point calibration. The PhoCheck+ scales its linear output across a ZERO level (clean air reference) and the SPAN (a user defined gas concentration).

Factory Calibration
'Factory' calibration offers a safe set of calibration data. This should be used if the custom calibration fails and will keep the unit working until a good custom calibration is completed.

ION Science recommends an annual service and calibration for users who require a traceable calibration. During this service the lamp and detector is brought back to factory specifications and new Factory Calibration data is stored.

Instrument Menu

Calibration (continued)
Custom calibration
For increased accuracy you can perform a Custom Calibration. You will need a cylinder of calibration gas and a regulator. 100ppm Isobutylene calibration gas at a flow rate above 250ml/min. PhoCheck+ allows you to custom calibrate using any gas from the Gas Table and any concentration from 10ppm. Use the IonPC software to adjust the desired gas and concentration.

Custom Calibration Procedure
Have a cylinder of gas, regulator and zero carbon filter on hand before starting this procedure. The LAMP calibration is only really necessary if the instrument is to be used for ppb applications on PhoCheck 5000.

Custom Calibration Procedure
Please ensure you are familiar with this entire calibration procedure before attempting to calibrate the PhoCheck+ instrument.

Note: The calibration of the PhoCheck+ instrument must be carried out in a clean air environment. Ensure all parts of the calibration kit are available and ready for use.

1. Select Custom Calibration procedure – a tick '✓' will appear to confirm the selection. Pressing Enter allows the user to enter the Custom calibration menu.
2. Scroll down and select the flashing ZERO
3. Remove the caps from both ends of the carbon canister included in the Cal Kit Sample supplied with your PhoCheck+, remove the probe and filter from the instrument and fit the carbon canister. Alternatively a known clean air supply can be used. Note – the carbon canister simply pushes onto end fitting - do not force and no turning is required.
4. Press the Enter key to start the ZERO process. A counter will count down showing how long the canister needs to remain connected.
5. At the end of the count down a tick '✓' will appear, indicating that the Zero has been accepted. Press Escape.
6. Disconnect the carbon canister and replace the cap ends. The useful life of the carbon canister will be shortened if the canister is open to atmosphere for prolonged periods.
7. Scroll down and select the flashing VOC.
8. The next screen shows the gas and gas concentration you have previously set up via the IonPC software. Select Enter.
9. A screen will show VOC, a gas bottle and a flashing highlighted number.
10. Present the instrument with the calibration gas and press enter, the number will begin to count down showing how long the instrument needs to be presented with the gas. A tick '✓' will appear indicating that the calibration has been accepted. Escape out of the calibration menu.
11. Now replace the instruments filter and probe ready for use.
12. Carry out a Bump Test to ensure calibration was successful. Instrument is now ready for use.

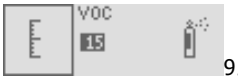
1.

2.

4.

7.

8.



9.

10.

If you are not successful in calibrating the instrument check the following points:-

- The carbon canister may be contaminated
- The calibration gas may be low or empty
- If using a connector pipe there may be a kink restricting the flow of gas
- PID lamp may require cleaning
- PID lamp may need replacing

Instrument Menu

Back-light (PhoCheck+1000, 2000, 3000 & 5000)

The instrument display can be illuminated when in low light conditions. When On is selected the back-light is on when ever the instrument is switched on. When Off is selected the back-light is permanently off. When Timed is selected the back-light illuminates for a pre-set time after every key press. When timed is selected pressing enter allows the user to adjust the on time from 1 to 60 seconds. This menu options is also available on the IONpc software.

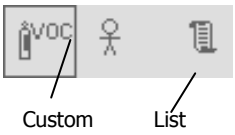
Date / Time (PhoCheck+2000, 3000 & 5000)

The Date / Time function allows the adjustment of the time and date used within the PhoCheck+ internal clock. The internal clock is used for the data logging date / time stamp. When readings are being stored for download and future use and record keeping ensure that the clock and date are accurately set. The 12/24 hour time format is also adjustable. Ion Science recommends that you set your date and time before using your instrument for the first time. This menu options is also available on the IONpc software.

PID Gas Selection (PhoCheck+1000, 2000, 3000 & 5000)

The PhoCheck+ photo ionisation detector (PID) is non-selective. Although many VOC gases are detectable, the PhoCheck+ PID cannot differentiate between the gases. When you select the VOC gas you wish to measure from the PhoCheck+ internal gas list, the instrument will calculate the equivalent level for that selected gas against an isobutylene calibration. Please note that there may be other detectable gases present that may effect the measurement.

Custom offers a quick route to the last 10 selected gases. When selected, use the UP and DOWN keys to change the gas then press ENTER to select.



List allows selection of any gas from within the gas table held in the PhoCheck+ memory.

After selecting the List symbol, select the first letter of the gas you wish to select and press ENTER. The PhoCheck+ will then list all gases starting with that letter. WMD gases are prefixed with the letters WMD.

Alarm levels that are set in the Gas table will be automatically selected. Should a gas be selected that is not compatible with the selected lamp the following symbol will appear to highlight the incompatibility.

PID Lamp (PhoCheck+1000, 2000, 3000 & 5000)

An alternative lamp to the Krypton 10.6eV (standard) can be purchased, fitted and selected. A tick '✓' confirms the selection. Should a Lamp be selected that is not compatible with the selected gas the following symbol will appear to highlight the incompatibility. This menu option is also available on the IONpc software.

Instrument Menu

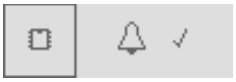
Unit Selector (PhoCheck+1000, 2000, 3000 & 5000)

The PhoCheck+ photoionisation detector can be selected to measure VOC's in either ppm (Parts per million, by volume), ppb (Parts per billion) or mg/m^3 (Milligrams per cubic meter).

NB: the ppb option is available on the PhoCheck+ 5000 and is upgradeable on the 1, 2 and 3000 versions. This menu option is also available on the IONpc software.

Data Log Memory Alarm (PhoCheck+2000, 3000 & 5000)

PhoCheck+ has been designed to continuously store data. Once the memory has reached its full capacity (8 Mb) it will



automatically begin to over write previous readings. An alarm can be set to inform the user that this is due to happen giving the user time to download any data that may be over written if they wish to do so. This menu option is also available on the IONpc software.

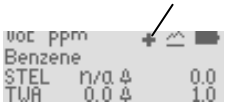
Application - Survey Mode (PhoCheck+1000, 2000, 3000 & 5000)

SURVEY is the default mode of operation whenever the HEALTH & SAFETY mode is NOT selected. All functions can be adjusted or selected in this mode unless the SECURITY mode is set via the IonPC software. SURVEY mode is often used in applications where several areas (or Zones) can be monitored and readings data logged. Saved data can then be downloaded to a PC for long-term storage and review. High and low alarm levels can be set.

Application - Health & Safety Mode (PhoCheck+3000 & 5000)

Modes of operation are selected to suit how the instrument is being used. Health & Safety mode is used to check for conformity of short-term exposure levels (STEL) or time-weighted averages (TWA) that are specific for particular hazardous environments (for example EH40 in the UK and OSHA in the USA). In this mode of operation STEL's and TWA's are continually calculated and compared to levels set in the instruments gas table. You can not adjust settings or parameters of the instrument while in Health & Safety mode as these could effect the ongoing calculations. Should you want to proceed with an adjustment a WARNING screen will appear. You have the option to continue with the adjustment by pressing Enter or abort and continue monitoring by pressing the ESC key. Continuing with the adjustment will reset the instrument, calculations will begin again from 0 once back in Health & Safety mode.

When selected



Security

When the PhoCheck+ is connected to a PC via the PhoCheck+ software package (see page 20), the instrument can be locked in the Menu Settings area of the software package. This facility allows the instrument to be set-up by a qualified or competent person. locked and then handed to an operator for use. When in secure mode the PhoCheck+ functionality cannot be changed or adjusted. The user can only view the display screens and switch the instrument On and Off.

IonPC Software

PC Requirements

IonPC Software must be used in conjunction with a PC/laptop using Windows XP. An IRDA port is required for communication with the instrument. Many laptops are supplied with this facility. Alternatively IRDA modules can be purchased from most computer retailers for use with your instrument. Before connecting your PhoCheck+ to a PC for the first time, confirm that the PC's IRDA works correctly with another devise.

Installation of IonPC Software

1. Insert Ion Science software CD into your CD rom drive
2. The CD will automatically start up
3. Click on the Download Software button
4. The IonPC setup wizard will start.
7. Follow the instructions on screen.
8. The installer will automatically create a folder in your C drive to save IonPC into if you do not want to save it there Browse for the location you would like it to be saved in and click Next
9. Select Next again and on to install the software
10. The software will take a few seconds to install then click Finished
11. You will now be able to open your IonPC software from the Icon on your desk top or from your Start Menu/Programs/IonPC

Connecting PhoCheck+ with a PC

Switch on your PhoCheck+ instrument, enter the function menu and select the Data Transfer symbol by pressing the enter key. When communicating with a computer the PhoCheck+ displays a '✓' within the data transfer symbol. When not communicating an X will appear.

Place the PhoCheck+ on its side with the instruments infrared window a few inches from the PC IRDA, then start the IonPC software.

Starting IonPC Software

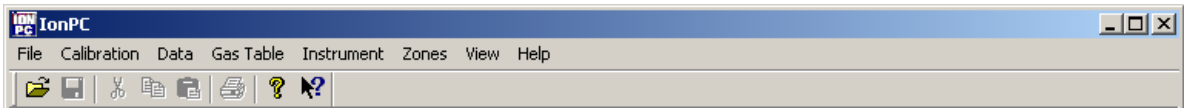
Start the IonPC software either from your desktop via the shortcut or from the Start menu/Programs/Ion PC. The instrument has 8Mb of memory, which is divided into 1Mb segments. When a segment becomes full, data is then stored in the next segment.

Each time the user starts data logging, a new file is created. So, for example, six data logging sessions will create six data files.

When a data logging session records data which spans across two or more 1Mb segments, a corresponding number of files will be created and stored within the instrument and will apply to that particular data logging session only. So, for example, two 1Mb segments spanned will result in two files created.

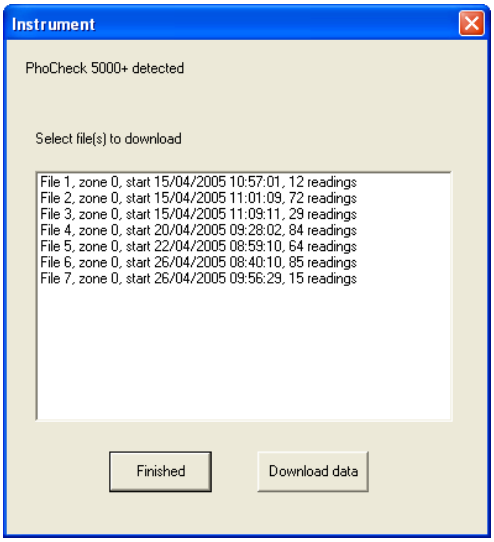
When the data is to be downloaded via the IonPC software, any files that have spanned two or more 1Mb segments (i.e. two or more files) will be recognised and downloaded as a single file.

IonPC Software



IonPC software has many features allowing the transfer for data and function specifications to and from the instrument and the PC.

Downloading data logged readings

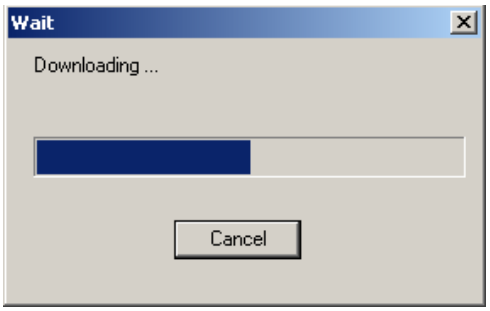

Instrument
PhoCheck 5000+ detected
Select file(s) to download
File 1, zone 0, start 15/04/2005 10:57:01, 12 readings
File 2, zone 0, start 15/04/2005 11:01:09, 72 readings
File 3, zone 0, start 15/04/2005 11:09:11, 29 readings
File 4, zone 0, start 20/04/2005 09:28:02, 84 readings
File 5, zone 0, start 22/04/2005 08:59:10, 64 readings
File 6, zone 0, start 26/04/2005 08:40:10, 85 readings
File 7, zone 0, start 26/04/2005 09:56:29, 15 readings
Finished
Download data

PhoCheck+ should always be presented to the IRDA port before the IonPC software is run.

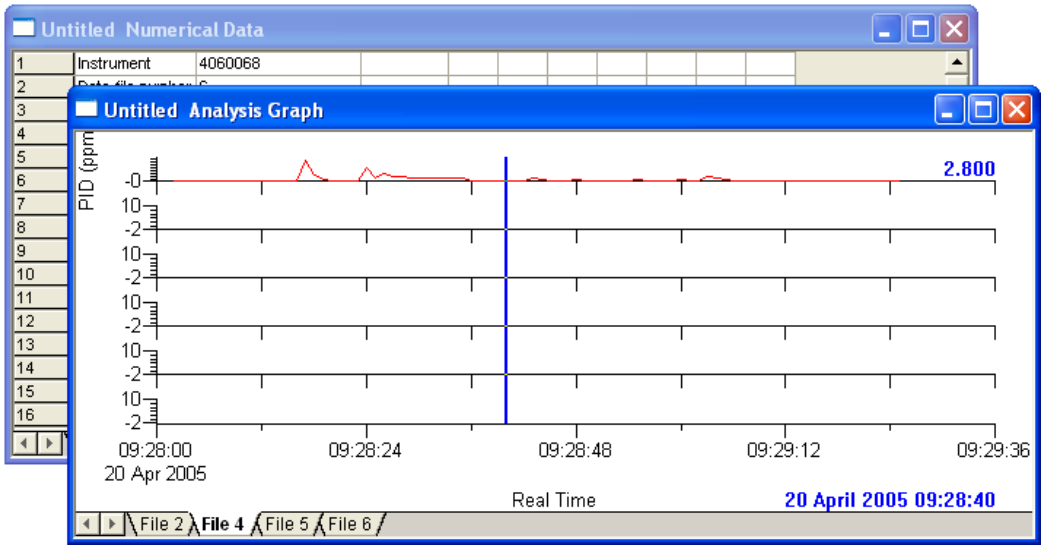
When the software is opened like this it will immediately begin communicating with the instrument and will give you the option to download data logged readings, as shown here.

Select FINISHED if you do not wish to download the data.

If you do wish to download data, highlight the files you require, and then select Download data. The screen on the right will appear.



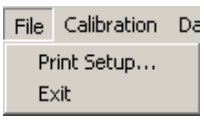
The data will then download from your PhoCheck+ to your PC in numerical and graph format. Once the download is complete select Finished. You then have the ability to zoom in on the graph data for a closer look by double clicking anywhere on the graph. You can also store the data for future reference.



IonPC Software

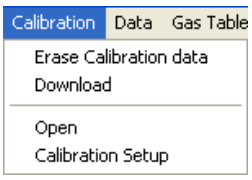
File

Allows the printing of files downloaded from your PhoCheck+ instrument.



Calibration

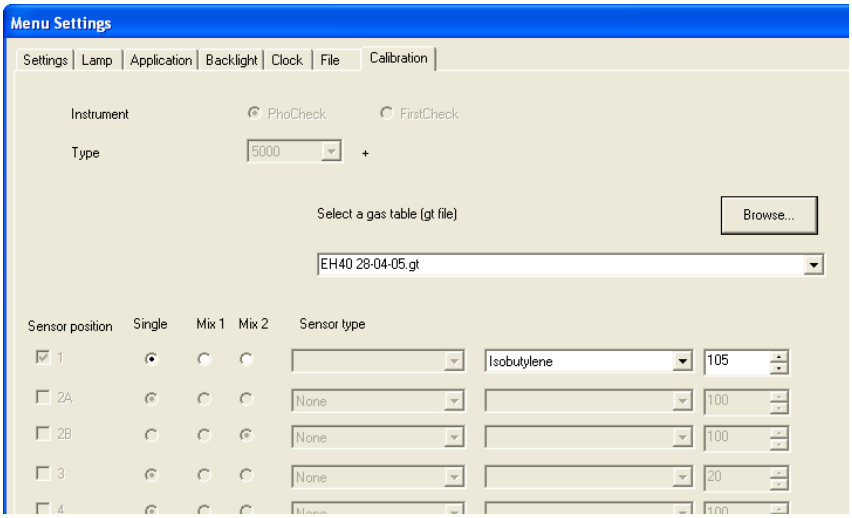
Refers to the CUSTOM calibration of PhoCheck+. Enables the download of calibration data from the instrument to a PC, the erasing of the Custom calibration settings, the opening of previously saved calibration settings and the adjustment of the CUSTOM Calibration Setup.



Calibration Setup

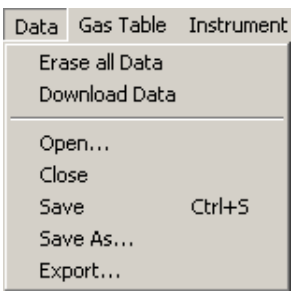
The gas table provided with the software will be shown. However if you wish to use a different gas table previous selections will be shown on the drop down menu; or click BROWSE and search for and select the table you require.

You can now choose to set up your Custom calibration to your specific gas and concentration requirements. Click APPLY to send your specifications to the instrument. You are now ready to calibrate your PhoCheck+, see page 16for details. The greyed out areas apply to the FirstCheck software, required if you upgrade your instrument.

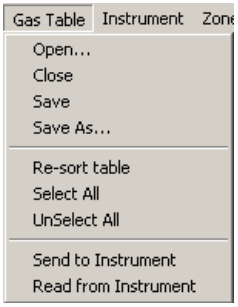


Data

Data logged information can be cleared from your instrument or downloaded from the instrument to your PC. Once downloaded to your PC files can be saved for future reference and exported as CSV files.



IonPC Software



Gas Table (including setting alarm levels)

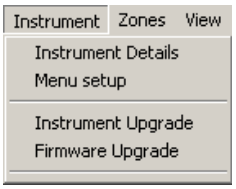
Select a gas table stored in the PhoCheck+ directory. You are able to modify this table and then download it to your instrument. If you wish to add new gases to the table ensure you use the next available line, leaving no spaces as shown below. Upper and lower alarm levels in Survey mode can be adjusted via the gas table. Type the desired alarm level in the appropriate column (either high or low alarm) against the gas you wish to change. Use the tick boxes beside each gas to select / deselect the gases to be downloaded to your PhoCheck+ then select SEND TO INSTRUMENT from the dropdown menu shown above.

Always save modified gas tables under a different file name, keeping the original complete.

EH40 28-04-05.gt

Select	Gas Name	Abbreviation	Formula	Molecular weight	11.7eV (Ar) Factor	10.6eV (Kr) Factor	10.2eV (D2) Factor	8.4 (Xe) F
☑	Xylene, o-		C8H10	106	0.69	0.6	0.57	ZR
☑	Xylene, p-		C8H10	106	0.62	0.46	1	4
☑	Xylidine, all		C8H11N	121	NA	0.7	NA	ZR
☑	WMD Arsine		AsH3	78	NA	2	ZR	ZR
☑	WMD Lewsite		ClCN	62	NA	1.2	ZR	ZR
☑	WMD Mustard Gas		C2H2AsCl3	159	NA	1	ZR	ZR
☑	WMD N-Mustard Gas		C4H18SCl2	172	NA	1.1	ZR	ZR
☑	WMD Phosgene		COCl2	99	2.1	ZR	ZR	ZR
☑	WMD Sarin		C4H10PO2F	140	NA	3.1	ZR	ZR
☑	WMD Soman		C7H116P02F	182	NA	3.2	ZR	ZR
☑	WMD Tabun		C5H11PN202	162	NA	1.2	ZR	ZR
☑	WMD VX		C11H26PNS02	267	NA	1	ZR	ZR
☑	WMD GF		C7H14P02F	180	NA	3.3	ZR	ZR
☑	WMD DMMP		C3H9P03	124	NA	5	ZR	ZR
☑	WMD Triethyl phosphate		C6H15P03	182	NA	3.5	ZR	ZR
☑	WMD Methyl salicylate		C8H19O4	152	NA	1	ZR	ZR
☑	New gas	Mix	C14H12	101	1	1.2	3	10
☐								

PID



Instrument

Instrument details such as serial number and data logged memory used can be downloaded from your PhoCheck+ to your PC. Instrument upgrade allows the upgrade of your instrument to other PhoCheck+ variants once you have purchased the pass code from ISL. Firmware upgrade allows you to upgrade your actual instrument software directly should an upgrade be made available. 'Menu Set-up' allows you to change PhoCheck+ settings from your PC. These settings can be saved for future use.

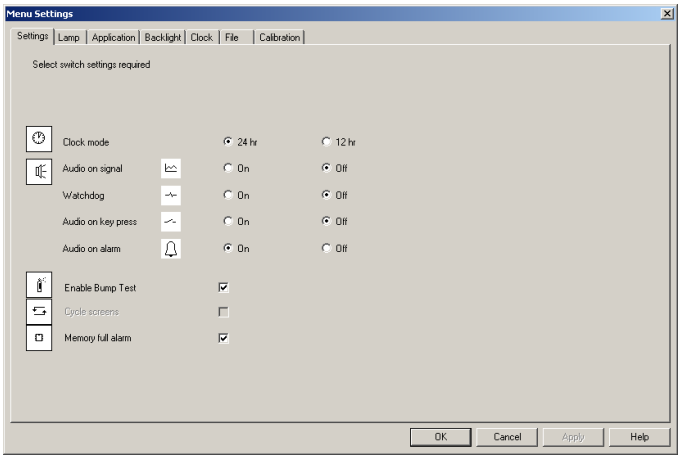
Menu Set-up

Adjustable features found on your PhoCheck+ instrument can also be changed via your PC along with some additional features. These features can be adjusted and then downloaded to your instrument by selecting Apply.

IonPC Software

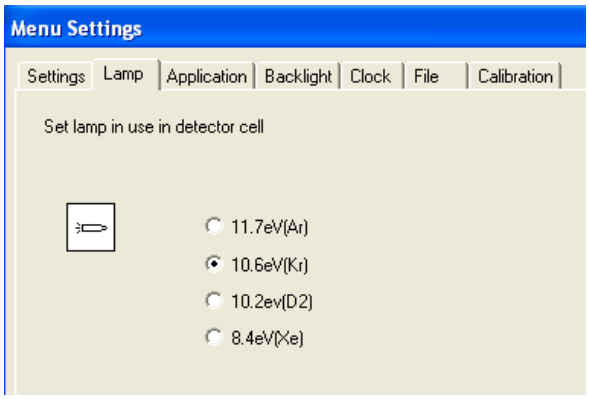
Settings

Within this tab there are a number of additional features including the clock (24 hr or 12 hr), sound controls on signal, confidence (a beep sounds every 15 seconds), on key press and on alarm. When selected the Enable Bump Test sets the instrument to show a gas bottle image once a week when the instrument is turned on as a reminder to test the instruments response. Memory full alarm will ensure an alarm sounds if the PhoCheck+ data log memory is full to enable you to download the data or continue and overwrite previously saved data. Cycle screen is blocked out as this is an upgrade feature on the FirstCheck.



Lamp

Enables the selection of different lamp types you may have purchased to use with your instrument.

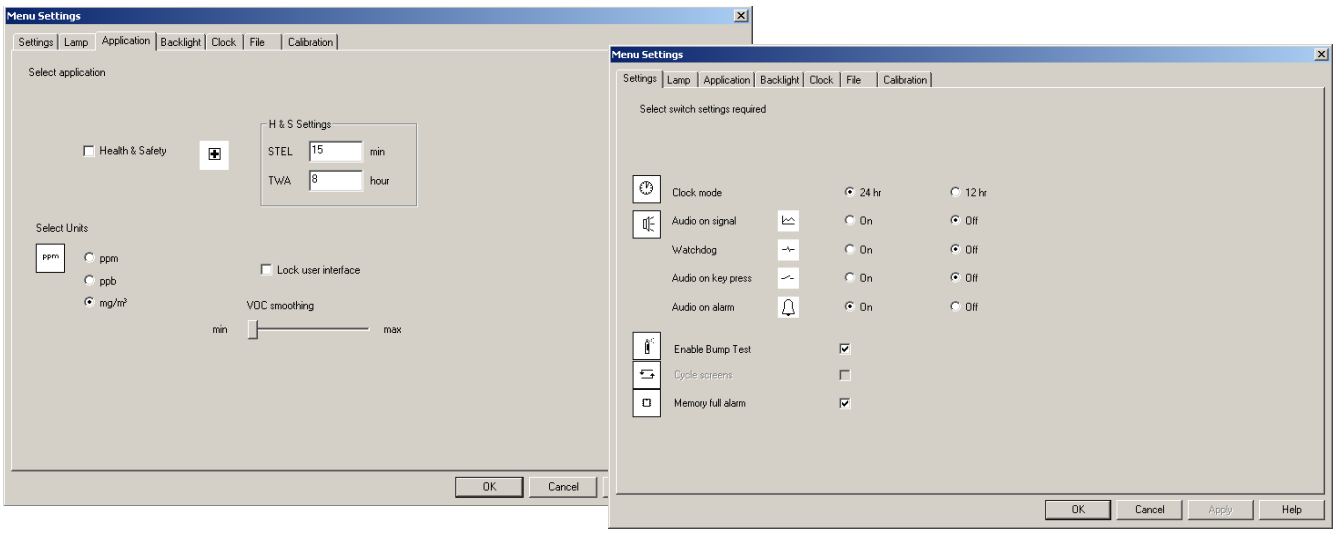


Application

Enables the selection and de-selection of Health & Safety mode and the selection of ppm, ppb or mg/m^3. In Health & Safety mode STEL and TWA timings can be adjusted to reflect the changes in legislation between the US and Europe.

The instrument can be set to security mode which enables the locking of the user interface so that the instrument functions can not be changed manually. To de-select security mode, switch the instrument Off then On, you then have 2 minutes from 'switch on' to connect your instrument to a PC and select Instrument / Menu set up. This will automatically place your instrument in PC mode ready for download or further adjustment.

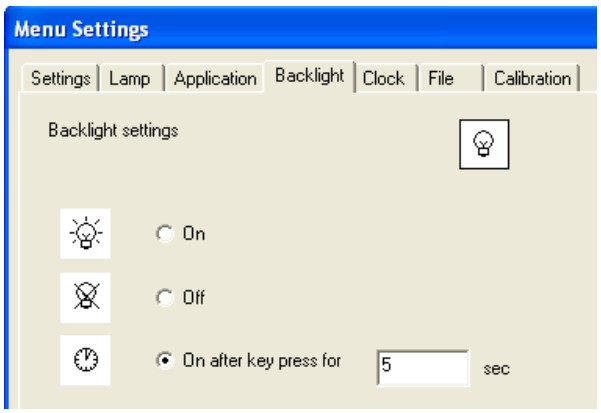
VOC smoothing relates to the PID reading and is used to have a dampening affect on the measurements for high gain factor gases. In effect increasing the T90 time to create a smoother graph. This affect can only be applied when in SURVEY mode it does not apply in Heath & Safety.



IonPC Software

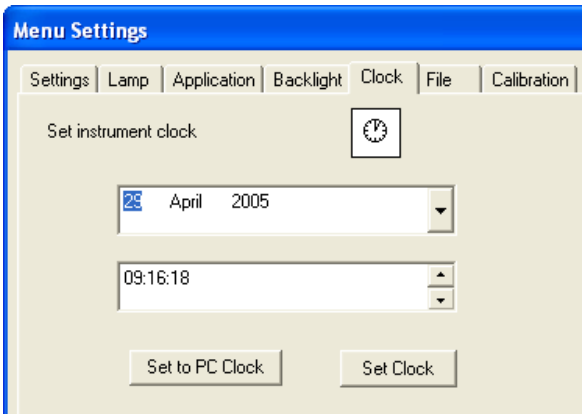
Backlight

Gives you the option of turning the back light on or off permanently or setting it on a timer after every key press.



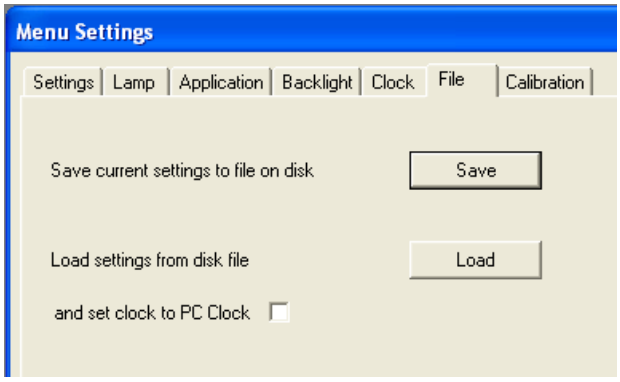
Clock

Set the instruments clock and date for the purposes of data logging. Either set it manually or if your PC clock is correct you can simply set your instrument to the same time as your PC clock.



File

Allows you to save the settings you have created to your PC for future use. It also enables you to open previously saved settings to then download to your instrument.



IonPC Software

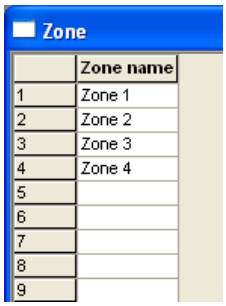
Calibration

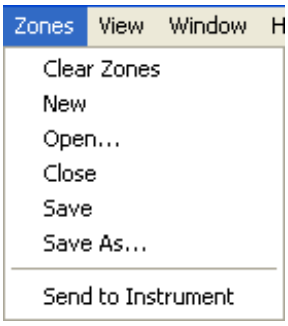
The calibration settings can also be adjusted under the Menu Settings and it is the same layout as described on page 16.

Once you have selected all of your settings you can either choose to APPLY them, which will download the information straight to the instrument and leave the screen open, or select OK, and they will be transferred to the instrument and the screen will close automatically.

Zones

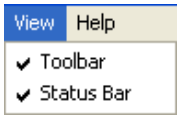
Clear / Delete existing Zones from your instrument or create new Zones for download to your PhoCheck+. Please note data files stored within a Zone to be deleted will be lost. Always download Data from your instrument before deleting Zones.





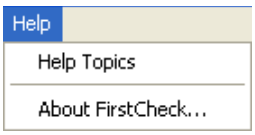
View

Select or hide the IonPC software toolbar or status bar.



Help

Offer advice on the use of IonPC software.



IonPC Software

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PhoCheck+ is a portable gas-detector suitable for the detection of; volatile organic compounds (VOC's) using PID (Photo Ionisation Detection) technology.

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Governing Law

The laws of the United Kingdom govern this Agreement.

Batteries

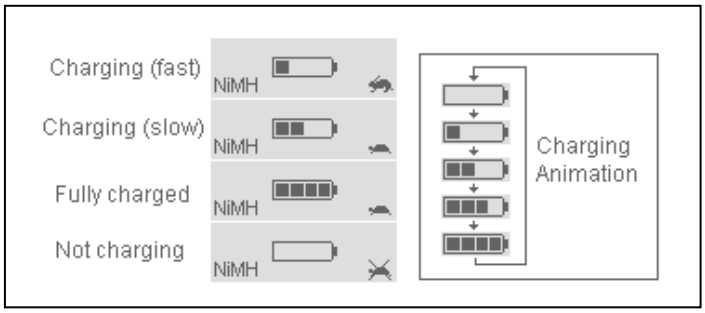
Note: Ion Science recommends keeping your PhoCheck+ on charge at all times when not in use, as batteries can loose power over time. Loss of battery power can result in the instrument's charge indicator showing a NON-CHARGING status when trying to charge the unit. If this occurs, leave the charger connected for two minutes, then remove and reconnect the charger as soon the timer symbol disappears. You will now see the instrument charge as normal.

WARNING:
For reasons of Intrinsic Safety, batteries MUST NOT be charged or replaced within potentially flammable areas. Ensure you are in a SAFE area before carrying out any type of maintenance on your PhoCheck+ instrument.

Non-rechargeable battery types to be used
For Intrinsic Safety of T4 rating and reduced risk of explosion you must only use Duracell Standard, Procell Alkaline, Zinc Carbon R6, R6B, or R6PP batteries. DO NOT mix old / used batteries or batteries from different manufacturers.

Rechargeable battery instruments*
Ensure rechargeable PhoCheck+ instruments are charged for at least 12 hours before using it for the first time. To ensure optimum charging the charger should be attached to the PhoCheck+ when the instrument is switched off. The instrument should be charged in a non hazardous environment only.

When the instrument is on charge the screen will display the instruments charging status.

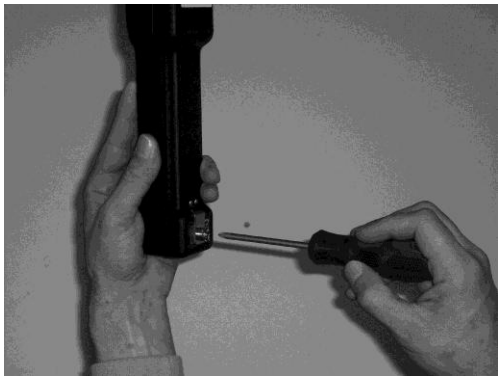


When the battery power is very low the following symbol will appear.

***NB: Only use the charger supplied with your PhoCheck+ to charge your instrument.**

Batteries

Replacement of Non-rechargeable batteries



1. Ensure the PhoCheck+ is switched Off.

2. Using the battery cover removal tool provided, remove the battery cover at the rear of the instrument casing. This reveals a set of 4 x AA cells contained in a removable battery clip.

3. Remove the battery clip.

4. Replace the exhausted batteries using the guidelines stated above.

5. Check all batteries have the correct polarity before reconnecting the clip to the instrument.

WARNING: Fitting batteries or connecting the clip with the wrong polarity may result in damage to the instrument!

Removable battery clip

NB: When loading batteries check for correct battery polarity before connecting them.

Diagnostics

Basic faults or diagnostics are presented as symbols with a more detailed description of the fault indicated by the number in the top right hand corner of the display. Should a fault occur correct the issue and then press ENTER or ESC to clear the fault message.

General fault

1. Main PCB failure.
Return the instrument to manufacturer.

Pump

1. Pump failure
Check the probe, filter and cell cap are fitted.
If the error persists return the instrument to the manufacturer.
2 & 3. Sample gas flow is low.
Check the probe and filter for signs of blockage.
if the fault persists send the instrument to your distributor for service.
Remove the lamp and blow out the detector with a can of computer duster.

Battery

Battery is low or:

1. Not charging.
Check charger is connected and switched ON at supply.
2. Slow charge current is low.
Check the battery settings.
3. Slow charge current is high.
Disconnect the charger immediately and contact ISL.
4. Fast charge current is low
Check the battery settings.
5. Fast charge current is high.
Disconnect the charger immediately and contact ISL.

With all battery related faults, if the fault persists send the instrument to your distributor for service.

Sensor

1. Detector fuse has blown.
If the error persists return the instrument to the manufacturer.
2. dirty detector cell
If the PhoCheck+ is used without its filter or filters are not replaced on a regular basis, particles of dust or dirt can cause a range of effects.

Gas Selection

The gas being selected is not compatible with the selected lamp.
The lamp being selected is not compatible with the selected gas.
Press Esc and select a compatible gas and lamp.

Diagnostics

Health & Safety

When in Health & Safety mode the selected gas has no STEL or TWA alarm values. This provides a warning in Health & Safety mode that the change you are making could effect the ongoing calculations. You can proceed with the adjustment by pressing enter or return to the display screens by pressing Esc.

Memory Alarm

The data logging memory is full and will begin to overwrite previous readings. Will only show if the data logging memory alarm has been set to ON (see page 19). Press Esc and either continue (and previous readings will be over written) or download saved data to a PC before continuing.

Clock

The internal clock has failed.
Return the instrument to the manufacturer.

Delay

This symbol will appear during the manual adjustment and selection of functions of the instrument. It indicates that data within the memory is being moved. Please wait and the symbol will disappear after a few seconds depending on the change being made.

Bump test

This symbol will appear on switch on if the Enable Bump Test setting has been selected via IonPC software The symbol is a prompt that will appear once a week to remind the user to test the instrument responds accurately when supplied with gas.

Maintenance

Blowing out the PID Cell will fix 99% of maintenance problems

When using the PID instrument in conditions of high ambient humidity, the PID may show unexpected readings appearing to increase. This occurs due to dust or other small particles within the detector becoming hydrated with humidity. This causes these particles to conduct a signal between the electrodes. This issue can be resolved by the user in the field using the following procedure and a can of computer duster air.

First remove the lamp, following the instructions on lamp removal from the cleaning the lamp section below (steps 1 – 6). Using a can of computer duster, spray air down the small metal tube. Replace the lamp and cap and test the instrument.

1. Keep the PID detector lamp window clean.

2. Replace the sample filters on a regular basis.
   Frequency of cleaning the detector lamp and replacement of the filter depends on the type of gas being detected and the quality of the background air.

3. Secondary Probe Filter
   Designed to strengthen the instrument response, even in condensing environments.
   If the instrument background reading is high, change the main probe filter first. If the readings remain high it will be necessary to change the secondary probe filter as follows;

   a) Using an 11mm (7/16”) spanner unscrew the probe fitting from the end of the PID detector nozzle.
   b) Remove and discard the secondary probe filter.
   c) Insert a new secondary probe filter into the probe fitting.
   d) Screw the probe fitting back onto the nozzle and tighten using the 11mm (7/16”) spanner.

<u>CAUTION:</u> DO NOT OVERTIGHTEN THE PROBE FITTING

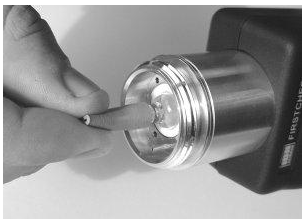
Cleaning the PhoCheck+ Lamp

The PhoCheck+ PID relies on an ultraviolet light source ionising VOC gases as they pass across the lamp window. This process may result in a very fine layer of contamination appearing on the detector window that must be removed on a regular basis.

CAUTION!

The PhoCheck+ is a sensitive detector. Internal components must be handled with clean hands and clean tools. The PhoCheck+ lamp is fragile. Handle with great care!

1. Ensure that the PhoCheck+ is switched OFF.



2. Remove the probe and filter. Unscrew the black knurled ring to expose the detector lamp.

3. Push a lamp-removing sleeve over the end of the lamp. This allows the user to grip the glass.

Maintenance

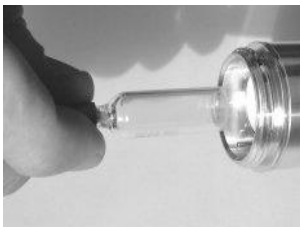
Cleaning the PhoCheck+ Lamp (continued)

4. Extract the lamp from its socket by pulling it in a straight line away from The PID cell. Force is only required when pulling the lamp past the O ring. Once past the O ring the lamp will move freely.

Past the O-ring

5. Inspection of the lamp may reveal a layer of contamination on the detection window that presents itself as a 'blue hue.' To check for contamination, hold the lamp in front of a light source and look across the window surface.

6. Inspection of the lamp may reveal a layer of contamination on the detection window that presents itself as a 'blue hue.' To check for confirmation, hold the lamp in front of a light source and look across the window surface.



Move freely in a straight line

WARNING! NEVER REFIT A DAMAGED LAMP!

USE of PID lamp cleaning kit A-31063

The vial of cleaning compound contains Aluminium Oxide as a very fine power (CAS Number 1344-28-1). A full material safety data sheet MSDS is available on request from Ion science ltd. The key issues are listed below:

Hazard identification:

- May cause irritation of respiratory tract and eyes.

Handling:

- Do not breathe vapour/dust. Avoid contact with skin, eyes and clothing
- Wear suitable protective clothing
- Follow industrial hygiene practices: Wash face and hands thoroughly with soap and water after use and before eating, drinking, smoking or applying cosmetics.
- The Compound has a TVL(TWA) of 10 mg/m^3

Storage:

1. Keep container closed to prevent water adsorption and contamination.

2. Open the vial of Aluminium Oxide polishing compound.
   With a clean cotton bud collect a small amount of compound.

3. Use this cotton bud to polish the PID lamp window. Use a circular action applying light pressure to clean the lamp window. Never touch the lamp window with fingers.

4. Continue polishing until an audible "squeaking" is made by the cotton bud with compound moving over the window surface. (usually within 15 seconds)

5. Remove the residual powder with short blast of air from the can of air duster.

6. The instrument MUST now be re-calibrated.

Accessories

Ion Science has developed an exclusive range of high quality accessories to compliment the PhoCheck+. Please find a list of accessories below. For the full range, contact Ion Science.

Part Number	Accessory Description
A-830206	IS Protective Cover II 1 G EEx ia IIC T4/ II 2 G EEx iad IIC T4 Baseefa 02ATEX0093X, Baseefa 03ATEX0742X PK of 10
A-845213	Calibration Kit
A-31064	25mm (1") diameter 0.5 micron probe filter PK of 5
A-31066	Std probe attachment PK of 5
A-31063	PID Lamp Cleaning Kit (20 Cleans)
A-30555	5 m (16 ft) flexible extension hose
A-30556	10 m (33 ft) flexible extension hose
A-31146	Secondary Probe Filters (pack of 5)
A-31153	Exhaust barb, Tedlar bag connector
A-31057	Carbon filter
30618	PID lamp, type 8.4 eV Xenon
30620	PID lamp, type 10.6 eV Krypton
30621	PID lamp, type 11.7 eV Argon
31052	Leather instrument jacket
40052	Leather instrument jacket with magnetic attachment
1/VS-18	Universal 9 volt power supply without plug
1/VS-20	9 V multi head universal power supply adaptor

Contact Ion Science or your local Distributor for more information.

Protective / Decontamination Cover

Description

This unique accessory enhances the base intrinsically safe approval of Ion Science instruments, including FirstCheck and PhoCheck, from category 2 (Zone 1) to category 1 (Zone 0) classification. The cover also increases instrument's ingress protection rating to IP66 allowing the instruments to be used in applications where the instruments are likely to get wet such as arson investigation, emergency response and in heavy rainfall.

The cover being very low in cost has the advantage when used in HazMat applications, including possible WMD exposure, in that it is simply removed after use and replaced with a fresh one keeping both the user and instrument safe from exposure long after the event.

NB: the IS protective cover must be used only once. If it becomes torn or damaged the intrinsically safe certification and ingress protection ratings revert to that of the instrument inside it.

Technical Specifications

Made from anti-static material

Baseefa02ATEX0093X / Baseefa03ATEX0742X

II 1G, EEx ia IIC T4 (-20 °C ≤ Ta ≤ +60 °C)

Dimensions: 430 mm (L) x 126 mm (W)

Please note double sided sticker adhisive must be applied in a dry atmosphere which is > 5 °C, it will then remain effective down to -20 °C.

Protective/Decontamination Cover

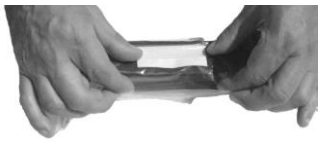
Fitting Instructions

1. Insert instrument into the IS protective cover ensuring that the probe tip exits through the small slit at the top of the cover and that the cover labelling and stickers are on the reverse of the instrument.

2. Seal the cover at its base and lay the instrument on a flat surface with the label and stickers facing upwards.

3. Peel off the backing to the large section of double-sided tape in the middle of the instrument.

4. Gather the excess plastic on one side of the instrument and stick it on the midway point of the double-sided tape.



5. Gather the excess plastic on the other side of the instrument and stick it to the remainder of the double-sided tape.

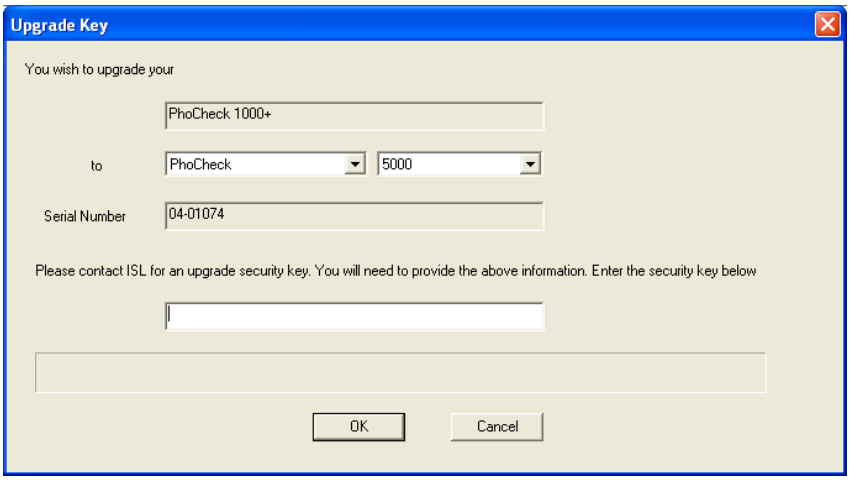
6. Now remove the backing from one of the small pieces of tape and secure it to the side of the instrument.

7. Remove the final piece of backing and secure it to the other side of the instrument.

8. The instrument is now ready to use in Category 1 (zone 0) areas and in applications where it is likely to get wet or contaminated.

Upgrade Options

All PhoCheck+ instruments have the ability to be upgraded in the field to higher versions throughout the range (1000-5000). The table below indicates if your model can be upgraded.



	PhoCheck + 1000	PhoCheck+ 2000	PhoCheck+ 3000	PhoCheck+ 5000
PhoCheck+ 1000		Upgrade	Upgrade	Upgrade
PhoCheck+ 2000			Upgrade	Upgrade
PhoCheck+ 3000				Upgrade
PhoCheck+ 5000				

Contact your local Ion Science distributor for pricing.

The upgrade process is easy and the instrument does not need to be returned to the distributor or manufacturer.

After ordering the upgrade for your instrument a code will be sent to you by e-mail. Use the IonPC software to enter the code and your instrument instantly becomes the new version.

Technical Specifications

Detector	Range	Response Time*
PID (VOC detector)	1 ppb - 10,000 ppm (5000Ex) 0.1 ppm – 10,000 ppm (3000Ex) 0.1 ppm – 4,000 ppm (1000Ex and 2000Ex)	T90 < 1 second
Accuracy	+/- 5% displayed reading +/- one digit**	
Linearity	+/- 5% displayed reading +/- one digit**	
Battery	4 x AA size	Specified Alkaline or 1.2V Rechargeable NiMH
Alarm	Flashing LED and 90 dBA (10 cm) audible sounder	
Flow Rate (Approx)	220 ml/min or 220 cc/min	
Temperature	Operating Storage	-20 to 60 °C (-4 to 140 °F) -25 to 60 °C (-13 to 140 °F)
Dimensions	Instrument Standard Carry Case:	340 x 60 x 50 mm 420 x 320 x 97 mm
Weight	Instrument Packed in case	0.640 kg (1.4 lb) 3.1 kg (6.8 lb)
Materials	Instrument Standard Carry Case	Conductive carbon-loaded polypropylene-based resin casing. Polypropylene, with a polyester foam insert

*Response time of the instrument is affected by the use of a length of tubing in applications such as confined space entry. The following response times show the affect on the PID detector based on 213 ml/min with a filter attached with a tube internal diameter of 1.6 mm at 20 °C:

Length of tube	Flow ml/min	Response time in seconds
Standard probe	213	0.1
1 m	212	0.8
2 m	212	1.7
3 m	211	2.6
5 m	209	4.3
10 m	199	9.0
20 m	190	19.0
30 m	172	32.0

** Assumes constant environmental conditions

Technical Specifications

Expected lifetime of parts

Batteries
On the condition of normal use battery capacity will be reduced to approximately 70% after 250 full battery cycles or 1 year (whichever comes first).

New fully charged (rechargeable) batteries at 20 °C > 10 hours normal use.

Affects on battery capacity:
10% less per 10 °C drop in temperature.
As the batteries age they may self discharge to half capacity from fully charged state.
At 25 °C – 50 days
37 °C – 25 days
48 °C – 5 days
60 °C – 1 day
The back light will consume an additional 50% power and significantly reduce the instrument 'on time'.

Filter
The filter should be changed every 100 hours of use. This frequency should be increased for dusty or moisture laden environments.

PID Lamps
10.6 eV and 8.4 eV expected life of 3 years and 11.7 eV 1 month. Lamps are very fragile; please handle with care at all times, never touch the window and do not drop! Lamp cleaning for normal use is every 100 hours of use (based on 30 ppm for 100 hours). Reduce this if used in heavily gas contaminated environments. Please note that some esters, amines and halogenated compounds may accelerate window fouling; cleaning may be required for every 20 hours of use. Cleaning frequency will also depend upon alarm levels set and prevailing environmental conditions.

PID Cell
Electronic cell has an indefinite life however it may suffer contamination problems – it is essential that a clean filter is attached during use. Some gases such as methylene chloride in high concentrations may condense onto the walls of the cell. In these cases the instrument should be returned to an Authorised Service Centre for thorough cleaning.

NB: PID specifications relate to an isobutylene 100 ppm in air calibration at 20 °C and 90% RH.

Manual Version	Amendment	Date Updated	Instrument Firmware	PC Software
PhoCheck+ V1.6	Ion Science recommends keeping your PhoCheck fully charged at all times, in some circumstances batteries can loose power overtime while not in use. Updated to V1.7		V51	V1.24
PhoCheck+ V1.7	If batteries are extremely low the instrument will not turn on and indicates the battery is fully charged. To remedy this leave charger connected for 2 minutes, then remove charger and reconnect as soon as the hour glass disappears. You will now see the instrument charge as normal. Updated to V1.8	9/6/08	V51	V1.24
PhoCheck+ V1.8	Add information for IS Protective Cover. Updated to V1.9	18/6/08	V51	V1.24
PhoCheck+ V1.9	Add new software installation routine. Updated to V2.0	24/10/08	V51	V1.24
PhoCheck+ V2.0	• Declaration of conformity updated • Include note regarding lamp cleaning i.e. Blowing out the lamp will resolve 95% of contamination issues • Additional bump test after custom calibration Updated to V2.1	27/11/08	V51	V1.24
PhoCheck+ V2.1	Log added to back of manual. Updated to V2.2	09/01/09	V51	V1.24
PhoCheck+ V2.2	• Secondary Probe Filters added to Packing List (pg8) • Secondary Probe Filter maintenance added to list (pg43) • Secondary Probe Filter added to Accessories List (pg 47) Updated to V2.3	24/03/09	V51	V1.24
PhoCheck+ V2.3	Complete rewrite of Manual. Changes made to reflect new version of software V53. Any mention of Deuterium or 10.2 eV lamp has been removed Updated to V2.4	14/07/09 19/05/10	V53 V53	V1.24 V1.24
PhoCheck+ V2.4	Warranty added on cover page Declaration of Conformity updated Warranty updated on page 38 Contents page updated	22/07/10	V53	V1.24

Thank you for reading this data sheet.

For pricing or for further information, please contact us at our UK Office, using the details below.

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Please note - Product designs and specifications are subject to change without notice. The user is responsible for determining the suitability of this product.